

Remarks

By this Amendment, claims 1-5, 7-11, 13, 16, 17, 19-22 and 24-27 are amended and new claims 39-44 are added. After entry of this Amendment, claims 1-27 and 39-44 will be pending. Reconsideration in view of the above amendments and the following remarks is respectfully requested.

PRIOR ART REJECTIONS

In the Office action, claims 1-4, 7, 10, 11 and 13-25 are rejected under 35 U.S.C. § 102(b) over U.S. Patent No. 5,363,834 to Stuchlik (Stuchlik). Claims 5, 8 and 9 are also rejected under 35 U.S.C. § 102(b) over Stuchlik. These rejections are respectfully traversed.

Claim 1 is directed to an airgun. Among other features, claim 1 recites a compressed gas chamber, a barrel, a firing valve controlling gas flow between the compressed gas chamber and the barrel, a secondary cylinder connected to the compressed gas chamber and a secondary piston reciprocating within the secondary cylinder and dividing the secondary cylinder into a front volume connected to the compressed gas cylinder and a back volume.

The Office action states: "Stuchlik discloses a compressed gas chamber (136), a barrel (126), a firing valve (220), a second cylinder (226) connected to the compressed gas chamber (216)[sic] a secondary piston (236) a gas liquefied gas chamber (Col. 6, lines 30), a valve for transferring liquefied gas (240)"

Thus, the Office action asserts that the claimed compressed gas chamber is disclosed by Stuchlik's variable volume compression chamber 136, and that the claimed "second" (sic: secondary) cylinder connected to the compressed gas chamber is disclosed by Stuchlik's central bore 226. Further, the Office action asserts that the claimed "secondary piston reciprocating within the secondary cylinder" is disclosed by Stuchlik's element 236. Applicant disagrees.

The element 236 is not a piston and does not reciprocate. As understood, the element 236 is in fact stationary. Referring to Fig. 11, the abutment 232 at the left end of the central bore 226 is "held in place by means of a pin (not shown) which extends through aperture 238 in rod portion 236." Col. 6, lines 31-33. Neither the rod portion 236 nor the abutment 232 can be read as the claimed "secondary piston reciprocating within the secondary chamber."

The Office action makes a second reference to the claimed compressed gas chamber as Stuchlik's element 216, but this is inconsistent with the Office action's first reference to the

compressed gas chamber as Stuchlik's element 136. The second reference to the element 216 is assumed to be an error and has thus been ignored.

Because Stuchlik fails to disclose at least the claimed secondary piston reciprocating within the secondary cylinder, Stuchlik fails to anticipate claim 1. Because claims 2-5, 7-11 and 13-25 depend from claim 1, either directly or indirectly, these claims are also not anticipated. For at least these reasons, the § 102(b) rejection should be withdrawn.

Claims 6, 12 and 26 are rejected under 35 U.S.C. § 103(a) over Stuchlik. This rejection is respectfully traversed.

Claims 6, 12 and 26 depend from claim 1, either directly or indirectly. As stated above, claim 1 is not anticipated by Stuchlik, at least because Stuchlik fails to disclose the claimed secondary piston reciprocating with the secondary cylinder. Stuchlik also fails to teach or even suggest such a piston in combination with the other features as recited in claim 1.

Therefore, claim 1 would not have been obvious in view of Stuchlik. Accordingly, dependent claims 6, 12 and 26 also would not have been obvious in view of Stuchlik for at least the same reasons, as well the respective additional features recited in these claims. The § 103(a) rejection should be withdrawn.

CLAIM AMENDMENTS

Claim 1

Claim 1 is amended to simplify and slightly broaden the recitations of the cocking mechanism and the firing mechanism. As amended, claim 1 recites "a cocking and firing mechanism capable of selectively opening and closing the firing valve to allow pressurized gas in the compressed gas chamber to be released and directed through the barrel, the mechanism also controlling the transfer valve to selectively transfer fluid from the fluid source to the fluid chamber."

Claim 1 is also amended to provide correct antecedent basis for "transfer valve." Additionally, claim 1 is amended to replace the recitations of "liquefied gas" with the broader term "fluid," which encompasses liquids, gases and intermediate states.

The amendments to claim 1 do not narrow its literal scope. In addition, the amendments to claim 1 are not necessary to overcome the Stuchlik reference.

Claim 2

Claim 2 is revised to specify that "the compressed gas chamber comprises ambient air and the fluid source comprises carbon dioxide."

The amendments to claim 2 do not narrow its literal scope.

Claim 3

Claim 3 is revised to recite that "the secondary piston is movable in response to pressure in the back volume to at least partially disengage from the second cylinder and establish a fluid flow path between the back volume and the compressed gas chamber."

The amendments to claim 3 do not narrow its literal scope.

Claim 4

Claim 4 is amended to recite that "the compressed gas chamber and the front volume of the secondary cylinder are in fluid communication with each other."

The amendments to claim 4 do not narrow its literal scope.

Claim 5

Claim 5 is amended to depend from claim 1 and delete reference to claim 4. Claim 5 is also amended to follow antecedent basis rules for "first gas."

The amendments to claim 5 do not narrow its literal scope.

Claim 7

Claim 7 is amended to specify that "the secondary piston is movable in response to pressure exerted by the fluid in the back volume to at least partially disengage the secondary piston from the secondary cylinder, thereby enabling the fluid to flow into the compressed gas chamber and supplement the pressure applied through the barrel."

Claim 8

The body of claim 8 is amended to delete reference to claim 7. Claim 8 is also amended to recite "fluid" instead of "liquefied gas."

The amendments to claim 8 do not narrow its literal scope.

Claim 9

Claim 9 is amended to recite "fluid" instead of "gas."

The amendment to claim 9 does not narrow its literal scope.

Claim 10

Claim 10 is amended to recite the "cocking and firing mechanism" and to follow proper antecedent basis rules.

The amendments to claim 10 do not narrow its literal scope.

Claim 11

Claim 11 is amended to recite the "cocking and firing mechanism" for proper antecedent basis.

The amendment to claim 11 does not narrow its literal scope.

Claim 13

Claim 13 is amended to recite "fluid" instead of "liquefied gas."

The amendment to claim 13 does not narrow its literal scope.

Claim 16

Claim 16 is amended to follow proper antecedent basis rules.

The amendments to claim 16 do not narrow its literal scope.

Claim 17

Claim 17 is amended to recite "fluid" instead of "liquefied gas."

The amendment to claim 13 does not narrow its literal scope.

Claims 19 and 20

Claims 19 and 20 are amended to recite the "cocking and firing mechanism" consistent with the rules for proper antecedent basis.

The amendments to claims 19 and 20 do not narrow the respective literal scopes of these claims.

Claim 21

Claim 21 is amended to follow proper antecedent basis rules and to specify that the first gas referred to claim 21 is a gas in the compressed gas chamber. This recitation was recited in original claim 1.

The amendments to claim 21 do not narrow its literal scope.

Claim 22

Claim 22 is amended to specify "fluid" instead of "gas."

The amendment to claim 22 does not narrow its literal scope.

Claim 24

Claim 24 is amended to recite "fluid" instead of "liquefied gas."

The amendments to claim 24 do not narrow its literal scope.

Claim 25

Claim 25 is amended to recite that the cocking and firing mechanism is actuatable to fill the compressed gas chamber with ambient air at an elevated pressure, and to cause the transfer valve to initiate transfer of the fluid into the fluid chamber.

The amendments to claim 25 do not narrow its literal scope.

Claim 26

Claim 26 is amended to depend from claim 1 and to recite that the ambient air in the compressed gas chamber is compressed to a level resulting in an airgun muzzle velocity of a projectile fired through the barrel by the gas and the fluid expelled through the barrel is between about 750 ft/s and about 850 ft/s over a temperature range between about 45° F and about 85° F.

Claim 27

Claim 27 is amended to follow proper antecedent basis rules and to recite "fluid" instead of liquefied gas."

The amendments to claim 27 do not narrow its literal scope.

In the Office action, claims 2, 3, 4, 7, 25 and 26 are rejected under 35 U.S.C. § 112, second paragraph. These claims have been amended and are believed to satisfy all requirements of Section 112. Withdrawal of the rejection is requested.

NEW CLAIMS 39, 40 and 41

New claims 39 and 40 are added to claim some of the features deleted from original claim 2. New claim 41 depends from claim 40. No new matter is added.

NEW CLAIM 42

New independent claim 42 is added to provide an alternative claiming of the invention. No new matter is added.

Claim 42 is directed to an airgun propulsion system for propelling a projectile with a fluid under pressure. The propulsion system includes a first chamber capable of holding a first charge comprising a first compressed fluid, a second chamber capable of holding a second charge comprising a second compressed fluid, a movable piston and a valve. The movable piston has a first side defining a boundary of the first chamber and a second side defining a boundary of the second chamber. The piston is movable between at least a first position at which the first charge remains separated from the second charge and a second position at which the second charge is vented from the second chamber to the first chamber to supplement the charge in the first chamber. The valve is positioned downstream of the first chamber and upstream of the projectile. The valve is selectively controllable to open and to supply pressure from the first chamber to propel the projectile. When the movable piston is in the second position and the valve is opened, at least a portion of the first charge and at least a portion of the second charge are supplied through the valve to propel the projectile.

Referring to Stuchlik, it is noted that there is no mode of operation in which both a first charge and a second charge are supplied through the valve to propel the projectile. Rather, the Stuchlik approach provides for supplying compressed ambient air when configured in the

pneumatic mode (see Figs. 5 and 13), or, in the alternative, compressed carbon dioxide when configured in the carbon dioxide mode (see Fig. 11). Stuchlik does not teach or even suggest providing ambient air and carbon dioxide in the same firing sequence to propel a projectile. In fact, Stuchlik teaches against such a combination by providing for a device (block 312) that prevents insertion of a carbon dioxide cartridge when the gun is in the pneumatic mode. When the gun is switched between modes, all pressure generated from the current mode is vented before the gun is reconfigured into the other mode.

Claim 43 depends from claim 42. No new matter has been added.

NEW CLAIM 44

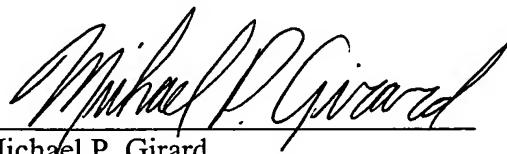
Claim 44 depends from claim 1 and recites the temperature compensating effect of the carbon dioxide in the back volume that results in substantially constant ambient air pressure in the compressed gas chamber over at least an interval of the firing process, leading to a substantially repeatable muzzle energy that varies less than about 10%. No new matter has been added.

Based on the foregoing, applicant believes the application is in condition for allowance and such action is respectfully requested. Should the examiner believe that anything further is necessary to place this application in better condition for allowance, the examiner is requested to contact applicant's representative by telephone.

Respectfully submitted,

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